

A study of patients referred from A&E for coroners post-mortem

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SUMMARY

A review of 179 autopsies was undertaken over a 1-year period to determine if clinically useful information was obtainable from coroners post mortems performed on patients referred from the A&E department. Fifty-six patients had undergone unsuccessful resuscitation. The leading causes of death were heart disease and trauma. Discrepancies between the diagnosis made during resuscitation and the cause of death found at autopsy were revealed especially in those dying from non-cardiac causes. Iatrogenic trauma from resuscitation attempts occurred in a significant number of cases. It is suggested that review of selected Coroners post mortems should be part of departmental audit, with a view to improving clinical skills.

INTRODUCTION

Patients suffering catastrophic illness or sudden death in the community are often brought to A&E and some undergo resuscitation procedures. Most patients who die are referred to the coroner who will order an autopsy in a variable proportion of cases. It is generally assumed that autopsy provides a good index of quality of patient care (Report of the Joint Working Party, 1991) and therefore concern has been expressed at the progressive decline in autopsy rates, especially in the elderly. It is our impression that despite the high rate of post mortems performed in those suffering sudden death compared to other causes, autopsy reports frequently fail to reach the clinician who may anyway underestimate the value of this investigation as a means of improving his clinical practice.

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Our aim was to document the causes of death confirmed by autopsy in patients declared dead in the A&E department, record any discrepancies in diagnosis made during resuscitation, and note any injuries caused by the resuscitation procedures.

METHODS

Information from coroners post-mortems was collected, with permission of the coroner, on patients who were referred from the A&E Department of the Leicester Royal Infirmary between 1 January 1988 and 31 December 1988. This was correlated with the A&E clinical record. Any injuries produced by resuscitation attempts were noted in addition to details of the cause of death.

RESULTS

A total of 325 deaths were declared in the A&E department during the study period. Altogether 179 autopsies were performed on patients aged 1–91 years (mean 54.5 years), an autopsy rate of 55%, and of these, 56 patients were unsuccessfully resuscitated in the department (age 1–91 years, mean 52.5 years), and 123 were brought in dead with no resuscitation attempt made (age 1–85 years, mean 55.4 years). The causes of death are shown in Table 1.

In the 45 cases of medical arrest (age 1–91 years, mean 55 years) the working diagnosis during resuscitation was not confirmed at autopsy in seven cases. The cause of death was assumed by the clinician to be cardiac when in fact two deaths were due to respiratory disease (bronchopneumonia). Two cases of pulmonary embolism and one ruptured aortic aneurysm were misdiagnosed as coronaries. One patient who died from meningitis was thought to have taken an overdose, and a young man who was thought to have had a sub-arachnoid haemorrhage had suffered a cardiac death. Malignant disease was found to be present in one patient only. This patient died of bronchopneumonia. Ventricular fibrillation was recorded in 12 patients (five dying from acute myocardial infarcts, three from left ventricular failure, three from ischaemic heart disease, and one from pulmonary embolus).

Of the 11 adult patients who suffered non-cardiac and non-traumatic causes of death only four were correctly diagnosed pre-mortem.

Seven patients with iatrogenic injury were identified (age 58–91 years, mean 72 years) in 45 non-traumatic deaths and included cases of fractured sternum, fractured ribs, flail segment, bruising of the left ventricle and laceration of the pericardium.

In cases of traumatic death it was impossible to identify injury due to resuscitation alone. As for a cause of death most were considered to have suffered 'multiple injuries' and a precise diagnosis was not often made. There was a tendency to overestimate the significance of head injury and under record chest injuries, but the numbers were small.

Table 1. Ca

Cause of death	Resuscitation	No Resuscitation
Cardiac		
Acute MI	12	25
LVF (no MI)	10	24
IHD	6	16
Aortic stenosis		1
HOCM	1*	
Tamponade-rupture		
Thoracic aorta		3
MI		2
Abdo aortic aneurysm	2*	3
Respiratory		
Pneumonia	3**	3
Asthma	1	1
CVA		1
Cot Death	5	3
Pulmonary Embolus	3**	
Meningitis	1*	
Trauma		
RTAs	9	32
Falls	2	1
Suicide		
CO Poisoning		2
Falls		4
Drowning		2
Overdose	1	
Total	56	123

* Each star represents a discrepancy in diagnosis MI, myocardial infarct; LVF, left ventricular failure; IHD, ischaemic heart disease; HOCM, hypertrophic obstructive cardiomyopathy; CVA, cerebro-vascular accident; RTA, road traffic accident and; CO, carbon monoxide.

DISCUSSION

Despite advances in diagnostic medicine, discrepancies between clinical and autopsy diagnoses are found in 10% of post mortems in different groups of patients studied (Anderson, 1984) and this has been so for many years (Goldman *et al.*, 1983). The discrepancy rate in sudden deaths is higher, Pounder *et al.* (1983) documenting an error rate of 37% in unexpected hospital sudden deaths and concluding that autopsy was essential to establish the true cause of death in this group of patients. This is in keeping with our findings.

The aetiology of sudden death has been ascribed to ischaemic heart disease in 50–90% of victims (Oalmann *et al.*, 1980). Adult patients arresting out of hospital are often assumed to have suffered a cardiac death. This not only leads to an overestimate of cardiac causes of sudden unexpected death in mortality statistics not supported by autopsy examination (Thomas *et al.*, 1988) but may influence the way in which resuscitation attempts are carried out. Those most often successfully

resuscitated out of hospital are patients arresting after myocardial infarction whose primary arrhythmia is ventricular fibrillation and who have had the benefit of early adequate cardiopulmonary resuscitation (Wardrope *et al.*, 1986). This study suggests that diagnoses apart from myocardial infarction should be considered during resuscitation even in cases of ventricular fibrillation.

The Joint Working Party (1991) has recommended that regular combined mortality meetings are held with active participation from pathologists and clinicians and diagnostic discrepancy rates monitored. We would accept that even major diagnostic errors may not materially have influenced the final outcome of patients in this study and this is why the clinician may not consider the autopsy to be a useful investigation. However, diagnostic and therapeutic errors were revealed only by autopsy and knowledge of these may have provided the A&E doctor with an opportunity to further his diagnostic and practical skills. These enhanced skills may then be applied to patients who are in earlier stages of disease and more amenable to effective treatment. Feedback through audit can improve medical knowledge but audit of post mortems is a frequently neglected area of current A&E practice.

Review of all cases would be impractical and so some selection of cases is necessary. Random clinical review of coroners post mortems would miss many cases in which potentially useful clinical information is available. There is little value in reviewing cases where clinical involvement is limited to declaration of death only. In cases where resuscitation has been performed we have demonstrated that errors in diagnosis are not infrequent. We would suggest selection of cases on the following criteria:

- (1) *Traumatic deaths.* The value of the post-mortem examination in patients dying from traumatic causes is well established and can identify injuries not diagnosed pre-mortem (Gordon *et al.*, 1989);
- (2) *Cases of iatrogenic trauma.* These can be identified by the pathologist and techniques of resuscitation reviewed and;
- (3) *Missed diagnoses.* In order that the pathologist can identify those patients who died of unsuspected causes the clinician should complete a clinical summary and dummy death certificate such as that suggested by the Joint Working Party (1991).

Out of 179 coroners autopsies performed 24 would have been reviewed on these criteria.

This review of autopsies has highlighted the high discrepancy rate in pre-mortem and post-mortem diagnoses in those dying from non-cardiac causes in the A&E department. Coroners autopsies have been shown to have value in revealing errors in clinical practice, from which much may be learned. This value is lost if the reports fail to reach the appropriate clinician and the cases are not discussed.

The group of patients who had no resuscitation attempt made died from similar causes to those unsuccessfully resuscitated. These patients suffer unwitnessed sudden deaths, die in situations where skilled help is delayed or absent or have a hopeless prognosis. Some may have survived with improved bystander training in CPR, but only prevention of ischaemic heart disease and accidents is likely to

have an impact on reducing numbers in this group. Nevertheless, autopsy on these patients will still be important to monitor the effect of preventative measures, and to accurately record the aetiology of sudden deaths in the community.

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